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ATOMIC LAYER DEPOSITION FOR FABRICATING THIN FILMS

ABSTRACT OF THE DISCLOSURE

An atomic layer deposition (ALD) process deposits thin films for microelectronic structures, such as advanced gap and tunnel junction applications, by plasma annealing at varying film thicknesses to obtain desired intrinsic film stress and breakdown film strength. The primary advantage of the ALD process is the near 100% step coverage with properties that are uniform along sidewalls. The process provides smooth ($R_a \sim 2\text{\AA}$), pure (impurities < 1 at. %), AlO_x films with improved breakdown strength (9 - 10 MV/cm) with a commercially feasible throughput.